A METHOD TO ASSOCIATE A PROBABILITY WITH A "SAFETY TRACE"

by

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1. INTRODUCTION.

Operational testing of weapon systems and training of combat crews are the foundations upon which each Air Force builds, maintains and ultimately achieves combat readiness. Weapon testing ranges are central to this effort. They must be designed, maintained and improved consistently with their individual potential to provide a realistic environment for both training and testing. Aircrew Safety must be granted through a system of range control and careful design of delivery patterns. Attention must also be given to the safety range support personnel.

In 1987 Reparto Sperimentale di Volo (RSV) was tasked to develop a method to produce "Safety Traces", which are defined as the hazard area of the bombing ranges where the bombs, released from an aircraft for crew training or weapon testing, could impact and ricochet.

By 1989 RSV Avionic and Armament Division (SSSA) had developed a software package capable of producing Safety Traces for both free-fall (F/F) and retarded bombs released in level and dive attacks. It was originally thought that this software could also be used to produce Safety Traces for "Loft" attacks. Following a deep analysis of the problem, it became clear that this was not possible, and another software package had to be developed specially designed to cover this delivery profile. The "Loft Safety Traces" software required aircraft manoeuvre entry conditions as data input in order to define the aircraft trajectory and therefore the release conditions. Besides an error vector δE had to be defined. Following several meetings with crew members a set of range tolerances was chosen to satisfy this requirment and in 1990 the new software package was ready.

At this stage it was believed that the task was completed, but, a few days later, another consideration came up: the "Safety Traces" which were produced were not "Safety Traces", but just "Traces" valid for the flight conditions which had been considered as likely inputs and for the chosen error vector. To make the program more reliable, as far as safety was concerned, the bomb trajectory probability in the "Security Area" had to be computed.